

The effectiveness of educational intervention based on PRECEDE model on the level of stress among the elderly at elderly clubs

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ABSTRACT

Introduction: The elderly are vulnerable to negative effects of stress factors; so, the present study was conducted to determine the effect of educational intervention based on the PRECEDE model on stress level of the elderly and to control stress factors. **Materials and Methods:** In this quasi-experimental study, 94 elderly people from the clubs for the elderly in Tehran were randomly divided into case and control groups in 2008–2009. Planning for the educational program was done according to the PRECEDE model. Before implementing the program, valid and reliable depression, anxiety, and stress questionnaires (DASS 21) were completed for both groups. The experimental group received the educational intervention based on the PRECEDE model (eight sessions, one session per week), and both groups were followed up two months after the intervention (the previous questionnaires were filled again). DASS 21 Scoring and Interpretation Generator was used for calculating scores of the questionnaires. Finally, the data obtained were analyzed by the SPSS 15 software using t-test, paired t-test, and Mann-Whitney test at a significant level of $P \leq 0.05$. **Results:** The findings showed significant differences between the experimental group and control group in terms of predisposing factors of knowledge ($P \leq 0.001$) and attitude ($P \leq 0.001$), enabling factors ($P \leq 0.001$), reinforcing factors ($P \leq 0.001$), and functioning especially in deep breathing and relaxation techniques ($P \leq 0.001$). Mean scores and severity of stress were significant after the intervention ($P \leq 0.001$). **Conclusion:** The findings of the present study confirmed the effectiveness of the PRECEDE model-based educational program on preventing or reducing stress level in the elderly.

Key words: Educational intervention, elderly, PRECEDE model, stress

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Access this article online	
Quick Response Code:	Website: www.jehp.net
	DOI: 10.4103/2277-9531.106641

INTRODUCTION

We are at the start of the 21st century, which has given people a life expectancy of over 66 years. Each year, 2.5% is added to the world population, which shifts the age ratio of the world toward the elderly.^[1]

The elderly are increasing in Iran, too. Based on the 2006 census, 7 million people are over 60 years in Iran.^[2] They need special attention in various aspects. The elderly are vulnerable to both physical and mental disorders. Some mental problems are more prevalent during this period of life^[3] including stress, which is a modern condition and underlies many physical and mental disorders.^[4]

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This article may be cited as: Sharifirad G, Ghaffari M, Zanjani S, Hassanzadeh A. The effectiveness of educational intervention based on PRECEDE model on the level of stress among the elderly at elderly clubs. *J Edu Health Promot* 2013;2:3.

The elderly are exposed to different kinds of stresses like change in family structure, and physical and physiological changes. Furthermore, social effects such as retirement, death of friends, and reduced social activity cause stress.^[5]

Considering all this, it is not possible to live without stress, either, but we have to learn how to cope with daily stresses and adapt our reactions to reduce their undesirable effects.^[6]

Studies on the effect of stress management techniques including relaxation show that using these methods can significantly reduce stress and its destructive effects.^[7-9]

In general, when it comes to changing human behavior in the field of health, health education and applying models is suggested. This helps explain how behaviors occur, how health education is applied, and how this education affects later behaviors.^[10]

Among interventional studies on models and theories of behavior change, that of Hazavehei *et al.* may be mentioned. After implementing an educational program based on the PRECEDE model, the mean depression score in the intervention group reduced significantly as compared with the control group.^[11] In addition, Lesan *et al.* studied firefighters and found a significant reduction in their anxiety after implementing the PRECEDE model-based educational intervention for the case group.^[12]

The PRECEDE model that is used in the studies mentioned is one of the most popular and common programming patterns in health education and health promotion.^[13]

The PRECEDE (Predisposing, Reinforcing, Enabling Constructs in Educational Diagnosis and Evaluation) model was designed by Green *et al.*^[14] This model begins from the final results (causes) and proceeds in seven consecutive stages of design, implementation, and evaluation. This model was based on epidemiologic and social behavioral sciences, management, and education. It is a planning model; not a theory. This model sees healthy behavior as influenced by personal and environmental factors. It determines the factors that affect health status, helps planners achieve their goals through intervention, and designs steps to formulate policies and implement and evaluate educational programs.^[14-16]

The results of studies on stress management showed that good planning makes various biological changes (like reducing hypertension) in a short time, but a comprehensive plan or a combination of individual with environmental programs is more effective and enables behavioral changes. The PRECEDE model is a similar program to manage stress.^[14] Therefore, this study aimed to determine the effect of the educational program based on the PRECEDE model on the stress of the elderly.

MATERIALS AND METHODS

This study was quasi experimental and case control. The

statistical society included the elderly (people over 60 years) in the elderly clubs of sixth and seventh regions of Tehran, which were selected by drawing lots. Because the number of the members of 60–75 years at these clubs is low, eight clubs were randomly selected. In each region, members of two clubs were randomly assigned to the case group and those of two other clubs were assigned to the control group. A sample size with a confidence interval (CI) of 0.95 and power of 0.80 determined 44 for each group by using the following formula:

$$N=2(Z_1+Z_2)^2.S^2/d^2$$

To obtain the required number of subjects, 97 volunteers enrolled in the study, and in the end, 94 remained.

The data collection tool was in the form of two questionnaires. The standard questionnaire of DASS 21 was used to evaluate depression, anxiety, and stress. This questionnaire has 21 questions, of which seven questions are used for each set of symptoms. This questionnaire is designed as a four-point Likert scale with the following choices: Not at all, some of the time, good part of time, and most of the time.

The least score for each question was 0, and the highest score was 3, which were respectively assigned to the first and last choices. The questionnaire was completed as a self-report. Validity and reliability of the questionnaire have been evaluated and confirmed in several studies.^[17,18] In addition, several researchers in Iran have used this questionnaire for psychological studies.^[8,9,19]

The next questionnaire was designed based on the PRECEDE model and had six sections. The first section covered demographics with 15 questions; the second section was about knowledge with nine questions where a correct answer had a score of 2, wrong answer had a score of 0, and 'I don't know' had a score of 1. The third section was about attitude with 10 three-level Likert-style questions (agree, no idea, disagree). The fourth section covered enabling factors with five questions. The fifth section was about reinforcing factors with three questions and finally the sixth section was about functioning with seven questions. This questionnaire was designed after studying books and articles, and interviewing 30 elderly people at the clubs for the elderly of Tehran. Then it was validated by several lecturers of health education and psychology for validity of face and content, and their comments were used for validity. Reliability of the questionnaire was measured using 30 of the elderly people by internal correlation ($\alpha=0.86$).

Both questionnaires were filled at two stages of pretest and at the end of the two-month educational intervention, in an interview with both groups of case and control. After the questionnaires were filled in the first stage, the data were analyzed and the content, objectives, and curriculum were adjusted based on these.

Educational intervention was carried out for eight weeks (one session per week). Mean duration of each session

was 75 minutes (ranging 60–90 minutes). The headings of the curriculum were determined for each session and included subjects like introduction to stress, its symptoms and complications, stress factors, the roles of nutrition, aromatherapy, massage, and laughter therapy in reducing stress, introduction to the role of social support as an important element in spiritual strengthening to combat stress factors, and introduction to relaxation behaviors, respiratory exercises, and stretch exercises suitable for stress reduction.

Educational pamphlets about introduction to stress, ways to cope with it, deep breathing, and relaxation along with a CD on relaxation were prepared. Lecture and question and answer sessions were held to increase knowledge of the participants. Group discussions about stress and positive experiences after practicing deep breathing and relaxation were held to change their attitude. Deep breathing and relaxation techniques were taught by the researcher, and in each session, the elderly were helped to relax. In addition, they shared their positive experiences at the beginning of each session to experience and reinforce replacement for others, and give them the opportunity to repeat these techniques at home. In this regard, they were given a sheet to record their exercises. Furthermore, friends and family members were allowed to attend educational sessions, and one session was held for questions and answers with families and friends to enhance their support. In the next stage, the educational program was implemented for the case group.

In the present study, educational resources included educational pamphlets, educators, educational classes, a CD on relaxation, educational photos, and slides about deep and correct breathing. The techniques included deep breathing, relaxation, stretch exercises, and hand and foot massage. Resources and skills were considered as enabling factors.

After executing the educational program, the effect of this program was evaluated on stress, and its predisposing, enabling, and reinforcing factors.

The collected data were analyzed by descriptive statistics (tables, mean, median...) and analytic statistics using the SPSS 15 software. Paired t-test and Wilcoxon test were used to compare mean score of predisposing, enabling, and reinforcing factors and mean of stress score and behaviors effective in preventing stress before and after education in each group. Independent t-test, Man-Whitney test, McNemar test, and chi square test were used to compare mean scores between the groups at two times.

RESULTS

Mean age of the participants in the case group and the control group was 63.68, and 64.42 years, respectively. In each group, there were 12 men and 35 women. The frequency of married people was 76.6% in both groups and 31.9% of the elderly in the case group and 40.4% of the elderly in the control group had a high-school diploma. In addition, 48.9% of the elderly in the case and 63.8% in the control groups lived with their spouse and single children. The independent t-test showed no significant difference between the groups in terms of the number of children. Totally, both groups were similar in background characteristics. Statistical tests did not find any differences between the two groups except for their current source of income.

There was no significant difference between the two groups in terms of mean score of knowledge, attitude, functioning, and stress, but after the intervention, all the differences were significant. Predisposing factors included knowledge and attitude toward stress, its symptoms and complications, and stress factors and ways to control them including deep breathing, relaxation, and exercise activities. After intervention, there was a significant difference between the two groups ($P < 0.001$).

Before intervention, the mean stress score was 19.7 ± 6.74 , and 18.89 ± 4.54 in the case and the control group, respectively. The difference was not significant. After intervention, the mean stress score in the case group reduced to 12.97 ± 4.5 . The paired t-test showed a significant difference between the two groups ($P < 0.001$) [Table 1].

Before educational intervention, 44.7% of the case and 59.6% of the control group said they sometimes used deep-breathing technique. Two months after the intervention, 68.1% of the case always used the technique whereas 19.1% of the control group used it. Furthermore, no difference was seen between the two groups in terms of the relaxation technique before intervention. After intervention, 61.7% of the case group sometimes used relaxation, and there was a significant difference between the two groups ($P < 0.001$) [Table 2].

No significant difference was found between the two groups in terms of accessing enabling factors (educational resources and classes). Two months after the intervention, chi square showed that the above-mentioned factors were significantly higher in the case group ($P < 0.001$) [Table 3].

Before the intervention, reinforcing factors (encouragement

Table 1: Comparison of mean scores of knowledge, attitude, functioning, and stress between the two groups before and after intervention

Group Situation Variable	Case			Control		
	Before intervention	After intervention	P value Paired t-test	Before intervention	After intervention	P value Paired t-test
Knowledge	70.91±12.37	82.05±10.17	0.001	70.25±10.78	70.41±10.35	0.64
Attitude	72.97±13.25	85.63±8.69	0.011	71.38±12.23	70.53±11.89	0.019
Functioning	56.99±16.07	74.77±11.42	0.001	58.81±11.93	58.35±11.47	0.445
Stress	19.7±6.74	12.97±4.5	0.001	18.89±4.54	19.7±4.27	0.048

*Data are reported as mean ± SD

Table 2: Comparison of frequency distribution of functioning in terms of deep breathing and relaxation in the two groups of case and control before and after intervention

Group	Time index	Technique	Case				Control			
			Before intervention		After intervention		Before intervention		After intervention	
Breathing		Never	20	42.6	0	0	11	23.4	11	23.4
		Sometimes	21	44.7	15	31.9	28	59.6	27	57.4
		Always	6	12.8	32	68.1	8	17	9	19.1
Significance level (Wilcoxon test)			$P<0.001$				$P=0.655$			
Relaxation		Never	28	59.6	0	0	35	74.5	35	74.5
		Sometimes	19	40.4	29	61.7	12	25.5	12	25.5
		Always	0	0	18	38.3	0	0	0	0
Significance level (Wilcoxon test)			$P<0.001$				$P=1$			

Table 3: Comparison of the access to enabling factors before and two months after educational intervention in the case and control groups

Index Enabling factor	Significance level of chi square test	
Educational resources to familiarize with stress and its consequences	Before intervention	$P=0.536$
	After intervention	$P<0.001$
Educational resources to familiarize with ways to control stress	Before intervention	$P=0.663$
	After intervention	$P<0.001$
Educational classes	Before intervention	$P=0.131$
	After intervention	$P<0.001$

*Chi square test was done between the case and control groups

of learning by family or friends, practicing methods to control stress, and positive experiences after using these methods) were not significantly different between the two groups. After the educational intervention, they were significantly higher in the case group. ($P<0.001$) [Table 4].

DISCUSSION

This study showed that after the educational intervention, the case group got higher scores in predisposing (knowledge and attitude), enabling, and reinforcing factors.

After the educational intervention, the mean score for ways to control stress was less in the control group than that in the case group. Therefore, lack of knowledge could be the main reason for not using them.

Lesan *et al.* found similar results with enhancing the knowledge of fire fighters about anxiety,^[12] Hazavehei *et al.* reported the same results with enhancing the knowledge of patients with bypass surgery of coronary arteries about depression,^[11] and Moshki *et al.* found similar results with enhancing the knowledge of students about improving

Table 4: Comparison of reinforcing factors before and two months after educational intervention in the case and control groups

Index Reinforcing factor	Significance level of chi square test	
Being encouraged by others to be familiar with the stress and stress management methods	Before intervention	$P=0.156$
	After intervention	$P<0.001$
Being encouraged by others in the absence of health risk factors during the occurrence of stress	Before intervention	0.397
	After intervention	$P<0.001$
Positive experiences after using stress management methods	Before intervention	$P=0.313$
	After intervention	$P<0.001$

*Chi square test was done between the case and control groups

self-esteem and mental health.^[20] Yates *et al.* used the PRECEDE model to do educational intervention, and found the same results in increasing the knowledge of patients in the case group about pain and perceived control after educational intervention.^[21]

Even in studies irrelevant to mental health that used the PRECEDE-PROCEDE (PROCEDE: Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) model, similar results were achieved in increasing mean score of knowledge including the study by Sanaenasab *et al.* on increasing the knowledge of workers about improving safe behaviors.^[22]

In the present study, mean score of the attitude of the elderly in the case group, especially in terms of learning ways to control stress, increased. This increase shows the effect of the PRECEDE model in increasing positive attitude. This finding has been confirmed in other studies that used the PRECEDE model including those by Lesan *et al.*,^[12] Hazavehei *et al.*,^[11] Moshki *et al.*,^[20] and Yates *et al.*^[21]

In the PRECEDE model, predisposing factors such as attitude precede behavior, and provide the main reasons and motivation to improve the behavior.^[14] Therefore, positive attitude of the participants facilitated adopting ways to control stress.

It is necessary to focus on the point that emotional aspects are usually weakly addressed in health education, whereas most decisions about healthy behaviors are based on emotions and attitudes. Expressing emotions can reduce stress and anxiety, and improve the self-concept of the individual.^[23] Therefore, we have tried to pay more attention to the emotional aspect in designing the educational content. The results are completely clear with regard to the changes.

With regard to using educational resources in terms of enabling factors before intervention, 12.8% of the case and 19.1% of the control group said that the resource they most used was mass media. This point shows that the importance of the educational content presented through mass media, especially their knowledge of relaxation as the main and most reliable way to manage stress and anxiety, was low.^[7-9,11,12,24]

After educational intervention in the case group, both using the information provided by the trainer and educational pamphlets, were the most used resources (Frequency = 100%). Making such changes in enabling factors has been observed in other studies based on the PRECEDE model. The results of the study by Dehdari *et al.* with regard to improving the quality of life in patients after bypass surgery,^[25] and those of Hazavehei *et al.*^[11] and Lesan *et al.*^[12] confirm such changes.

In the present study, encouragement by friends and family members and the positive feeling of the individual after controlling stress (deep breathing and relaxation) were considered reinforcing factors, and these increased after intervention in the case group. The results confirmed other studies that used the PRECEDE model in enhancing the reinforcing factors. In this regard, Lesan *et al.*,^[12] Hazavehei *et al.*^[11] and Dehdari *et al.*^[25] have reported similar results.

In the present study, teaching relaxation (functioning) was used to control their stress. The results confirmed the findings of other similar researches in reducing anxiety and stress. Some of these include studies by Galvin *et al.* on reducing stress and improving knowledge in the elderly,^[7] Hamidzadeh *et al.* on reducing anxiety and stress in the hypertensive elderly,^[9] Ghaffari *et al.* on the effect of relaxation on depression, anxiety, and stress on patients with multiple sclerosis,^[8] and Nikbakht Nasrabadi *et al.* on the effect of relaxation on anxiety of patients before abdominal surgery.^[24]

In the present study, stress was considered a health problem among the elderly, and the PRECEDE model was used as an interventional framework to reduce a mental health problem. The findings of this study confirms those of other studies that used this model for preventing depression in patients after bypass surgery,^[11] combining the educational theories in the

PRECEDE model and implementing it in reducing anxiety in fire fighters,^[12] and applying the PRECEDE-PROCEDE model to enhance the quality of life in patients after bypass surgery.^[25]

CONCLUSION

Because most of the health problems are closely related to people's lifestyle and families, health educators have an important role in behavior change of clients. Researchers hope that with the cooperation of health authorities, planners, and research centers, education interventional behavior programs are implemented extensively to reduce stress in the elderly. As a result, the factors of nonhealthy behaviors that predispose them to mental disorders reduce, thereby reducing health-care cost and improving their quality of life.

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Source of Support: This article was extracted from a Master's thesis in Isfahan University of Medical Sciences, **Conflict of Interest:** None declared.